

# DI504 - FOUNDATIONS OF DEEP LEARNING

## A GUIDE TO PROJECTS

You are required to prepare a project that will create a deep learning solution for a task that you choose. Some suggestions for choosing your topic:

1. Work on a topic that you know. You are encouraged to work on topics that are related to your thesis.
2. Do a literature review. Reading about your research area can help you find a topic for the project. ( [papers with code](#) is a great place to start)
3. Check on the public datasets available online. There are many publicly available datasets online. You can check either the helper libraries of PyTorch (like [Torchtext](#)) or websites like [Kaggle](#) to find datasets.
4. Lastly, if you have problems finding a project, feel free to ask your instructor or teaching assistant.

**Important Note:** You cannot submit a proposal that you have already worked on or submitted for another course's requirement. To be more specific, you can't submit the same proposal you have already submitted for the other deep learning courses.

You are going to do a literature review in the area. You can select your dataset and task after the literature review as well. Then, you can either implement a paper from scratch and make a marginal improvement on the method or propose a novel project. While considering your project topic, please keep in mind that;

- This is a 1-2-month project that you have to finish. After finishing the project, you need to submit a detailed project report. You are required to pay attention to the quality of the project report.
- You can use any dataset that is related to the task that you choose. Please keep in mind that it is a short project, and there are limited resources. If you want to work on a large dataset or a model, you can work on it at your own risk.
- During the project, you need to create a new Jupiter Notebook (or Google Colab notebook) (.ipynb file) with helper files if required. You can use reference code blocks as long as you give proper references. You can also use any version of PyTorch.
- Grading will be based on effort. The paper that you implemented may have codes available. In that case, you should implement the paper and try to propose marginal improvements. Failing to improve/implement is not important. As long as you prove that you worked on your project, you will get the points for the project.
- Individual projects are only allowed.

### First Deliverable: Project Proposal (Deadline: 05.12.2021)

You are required to submit a project proposal including the project topic description and a brief overview of your plans for implementing the project. A maximum of two pages is sufficient to submit at this phase. You can ask any questions you have in the meantime before submitting your final project proposal. Based on your proposal, we will give you official feedback later (whether it is accepted or any revision is required). Your project proposal must include;

- Which task did you choose? Describe your problem and aim.
- If you are going to implement a paper from scratch, you should give a summary of that paper. This summary should contain the steps like problem, solution, model and dataset.
- You should do a basic literature review and explain different implementations.
- You should explain which data/dataset you are going to use. You should also add the dataset's details like attributes, size and how the dataset was collected.
- Lastly, suppose there is a code available on your topic/paper. In that case, you should explain it and its architecture. You should also explain your implementation/improvement strategy based on the code.

## Second Deliverables: Project Report, Presentation and Implementation (Deadline: 24.01.2022)

You are expected to submit a **Jupyter notebook file** (notebook file is recommended but you may send your entire ready-to-run-project-zip as well), **helper files (if needed)**, and **a report**. Please don't submit pre-trained weights and datasets. If they are large files, give the links to the original download locations (if they are not available just upload it to the cloud).

Your Jupyter(\*.ipynb) file should contain cell outputs. These outputs should contain parameters like Epoch loss, train, validation and test graphs, network model, data size so on. Don't forget to comment on the lines so everybody can understand what each cell block is responsible/doing.

**Presentation:** You should prepare a presentation about your paper and record it as a video (or present it live in Zoom, your choice). It should take a maximum of 8 minutes. You will be informed later to where you are expected to upload the video. After the presentations are uploaded, we may contact you to ask some further questions if needed.

**Your project report and codes:** should clearly explain what your project is, your efforts and experiments. The paper report should be a maximum of 7 pages long and should follow the IEEE conference format<sup>1</sup>.

Your report should include;

- Introduction where you define your problem.
- Literature review: A minimum of three papers is expected to be read and referenced properly. It is important to select papers which are peer-reviewed. Check the reference fields properly. Ensure that there are no missing fields (some Arxiv papers have already been published. Use these publication names instead of referencing to Arxiv).
- Dataset and its details: You need to give details about your dataset and present a descriptive analysis.
- The method that you are going to use: Ensure to make hyperparameter optimization and report the details of the steps. You can use existing solutions such as Optuna<sup>2</sup>.
- Results you obtained: You need to make a comparison using well-known metrics with a baseline method. You can make an ablation study if it applies to your study.
- Conclusion and Discussion
- References

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<sup>1</sup> <https://www.ieee.org/conferences/publishing/templates.html>

<sup>2</sup> <https://optuna.org/>